WHAT IS CLAIMED IS:

1. A battery control apparatus comprising:

a battery pack including a series combination of cell units;

a motor drive control circuit to receive a discharge current from the battery pack to drive a traction motor of a vehicle, and to supply a charge current to the battery pack;

a current sensor to sense a discharge/charge current flowing from the battery pack as the discharge current and flowing to the battery pack as the charge current;

a voltage detecting circuit to sense a voltage between two separate points in the series combination of the cell unit of the battery pack;

a reference voltage drop memory section to store a reference voltage drop quantity representing a decrease in voltage during a predetermined time interval between the two junction points in a reference state;

an offset detecting section to compare an actual voltage drop quantity which is a decrease in voltage during the predetermined time interval between the two junction points, sensed by the voltage detecting circuit, with the reference voltage drop quantity stored in the reference voltage drop memory section, to detect a non-discharge/charge-current state of the current sensor in accordance with a result of comparison between the actual voltage drop quantity and the reference voltage drop quantity, and to reserve an output of the current sensor, as an offset quantity when the non-discharge/charge current state is detected; and

a correcting section to correct a sensed value of the discharge/charge current sensed by the current sensor, in

accordance with the offset quantity reserved by the offset detecting section.

2. The battery control apparatus as claimed in Claim 1, wherein the battery pack includes a plurality of cells, and each of the cell units includes at least one of the cells, wherein the reference voltage drop quantity is a preliminarily determined voltage drop quantity representing a voltage decrease during the predetermined time interval between the two separate points in the reference state in which the battery pack is connected only with the voltage detecting circuit; and the offset detecting section is configured to determine whether the actual voltage drop quantity is substantially equal to the reference voltage drop quantity, and to determine the existence or nonexistence of the non-discharge/charge current state of the current sensor in accordance with the result of examination as to whether the actual voltage drop quantity is substantially equal to the reference voltage drop quantity.

3. The battery control apparatus as claimed in Claim 2, wherein the voltage detecting circuit includes a total voltage sensor to sense a total voltage of the battery pack connected between the two separate points; the offset detecting section is configured to compare the actual voltage drop quantity which is an actual total voltage drop quantity sensed by the total voltage sensor, with the reference voltage drop quantity, and to judge that the current sensor is in the non-discharge/charge current state when the actual total voltage drop quantity is substantially equal to the reference voltage drop quantity.

4. The battery control apparatus as claimed in Claim 2, wherein the voltage detecting circuit is configured to sense a cell unit voltage across each of the cell units of the battery pack; the reference voltage drop memory section is configured to store the reference voltage drop quantity across each of the cell units; and the offset detecting section is configured to compare the actual voltage drop quantity with the reference voltage drop quantity for each of the cell units, to extract any cell unit for which the actual voltage drop quantity is substantially equal to the reference voltage drop quantity, and to detect the non-discharge/charge-current state of the current sensor in accordance with a proportion of extracted cell unit or cell units in relation to the battery pack.

5. The battery control apparatus as claimed in Claim 4, wherein the offset detecting section extracts any of the cell units as an off unit if the actual voltage drop quantity for the cell unit is substantially equal to the reference voltage drop quantity of the cell unit, and judges the non-discharge/charge-current state to be present when a percentage of the number of the unit cells extracted as the off unit, to the number of the unit cells is equal to or greater than a predetermined value.

6. The battery control apparatus as claimed in Claim 5, wherein the battery control apparatus further comprises a capacity adjusting circuit to adjust a capacity of each cell unit by performing a capacity adjustment operation on each cell; and the offset detecting section is configured not to extract any of the cell units as the off unit if the cell unit is under the capacity adjustment operation.

7. The battery control apparatus as claimed in Claim 4, wherein the reference voltage drop memory section stores the reference voltage drop quantity for each of divisions into which a voltage range of the voltage of each cell unit is divided; and the offset detecting section selects the reference voltage drop quantity for each cell unit in accordance with the voltage across the cell unit, and compare the actual voltage drop quantity with a selected one of the reference voltage drop quantity.

8. The battery control apparatus as claimed in Claim 1, wherein the current sensor is connected in a circuit section to sense a discharge current supplied from the battery pack to the motor drive control circuit and a vehicle accessory system, and the charge current supplied from the motor drive control circuit to the battery pack.

9. The battery control apparatus as claimed in Claim 1, wherein each cell unit is one of a single cell unit including only one cell and a multiple cell unit including a parallel combination of cells, and the offset detecting section is configured to detect the non-discharge/charge-current state even while a main switch of the vehicle is in an on state to put the vehicle in a normal running operation.

10. A battery control apparatus comprising:

a battery pack including a series combination of cell units;

a motor drive control circuit to receive a discharge current from the battery pack to drive a traction motor of a vehicle, and supply a charge current to the battery pack;

a current sensor to sense a discharge/charge current of the battery pack which is one of the discharge current and the charge current;

a voltage detecting circuit to sense a voltage between two separate points in the series combination of the cell units of the battery pack;

means for storing a reference voltage drop quantity representing a decrease in voltage during a predetermined time interval between the two separate points;

means for comparing an actual voltage drop quantity which is a decrease in voltage during the predetermined time interval between the two separate points, sensed by the voltage detecting circuit, with the reference voltage drop quantity, and for detecting a non-discharge/charge current state in accordance with a result of comparison between the actual voltage drop quantity and the reference voltage drop quantity;

means for storing, as an offset quantity, an output of the current sensor obtained when the non-discharge/charge-current state is detected; and

means for correcting a sensed value of the discharge/charge current sensed by the current sensor, in accordance with the offset quantity.

11. A battery control process for a battery system of a battery pack including a series combination of cell units, and a motor drive control circuit to receive a discharge current from the battery pack to drive a traction motor of a vehicle, and supply a charge current to the battery pack, the battery control process comprising:

sensing a voltage between two separate points in the series combination of the cell units of the battery pack to determine an actual voltage drop quantity during a predetermined time interval;

comparing the actual voltage drop quantity with a preliminarily stored reference voltage drop quantity, to judge a non-discharge/charge-current state to be present in accordance with a result of comparison between the actual voltage drop quantity and the reference voltage drop quantity;

reserving, as an offset quantity, a sensed value of a discharge/charge current when the non-discharge/charge-current state is present; and

determining a corrected current value by subtracting the offset quantity from the sensed value of the discharge/charge current.